PATENT APPLICATION
Docket No: 14321.91

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of		)
		)
	Masahiro Sasaura et al.	)
		)
Serial No.:	10/589,719	) Art Unit
		) 1722
Filed:	August 17, 2006	)
		)
Confirmation No.:	9542	)
		)
For:	APPARATUS FOR PRODUCING CRYSTALS	)

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. § 1.97

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed
Unaccompanied by English Translation
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Publication No. 57-095889: PURPOSE: To grow a single crystal of good quality and large size with good efficiency by providing a movable mesh-like heater in the crystal raw material in a crucible in a Bridgeman's method. CONSTITUTION: A seed crystal 9 of intended composition is placed in the lowermost part of a cylindrical crucible 4, and powder of composition making equil. coexistence with the crystal of the intended composition is put thereon, thence a mesh-like heater 6 is set and the powder mixed to the intended composition is placed thereon. A mesh- like material made by opening a large number of small holes of an arbitrary shape to a plate-like object or a heater made by weaving heater wires is used for the heater 6. The crucible 4 is set in the prescribed position in an electric furnace 1 and an electric power source is turned on to heat the crucible 4 to prescribed temps. and maintain it at these temps. When the heat in the upper and lower part of the crucible is made uniform, electric current is flowed to the heater 6 and an auxiliary heater 5 to make the part from near the heater 6 to the upper part of the seed crystal 9 higher by about 50 deg.C than the prescribed temps. and to maintain this part at these temps. for about 30min, after which the temp. of the heater 6 is raised gradually to melt the crystal raw material from the upper part, whereby the crystal is deposited from the lower part thereof.

Japanese Publication No. 59-107996: PURPOSE: To obtain easily a large single crystal in a process for growing single crystal by Bridgeman method and furnace temp. lowering method, by using a cylindrical crucible of a flat bottom, and changing the compsn. of sintered product to be charged in the crucible step wise. CONSTITUTION: A crucible with a flat bottom is used in a method by which a sintered product of solid solution composition of inorg. compound oxide is placed in the crucible and a single crystal is grown up by heating and melting. In the bottom of the crucible, a sintered product having an objective single-crystal composition is placed, and a sintered product having the composition contg. a larger amt. of an inorg. oxide having a larger specific gravity in the solid solution components than the objective single crystal composition is piled up thereon. Further, a temp gradient to make the temp. of the lower part of the sintered product in the crucible low, and the temp. of the upper part high is established to grow up the crystal by heating and melting. As described previously, it is possible to have the crucible the temp. gradient by bringing down the crucible into a furnace in which the similar temp. gradient is kept.

Japanese Publication No. 05-024965: PURPOSE: To produce a single crystal having high quality with good reproducibility by forming a solid-liquid boundary shape to a flat shape or a shape projecting toward a melt thereby preventing polycrystallization and to prevent the melting of a seed crystal. CONSTITUTION: This apparatus produces the single crystal by a VGF method of solidifying the melt gradually from below to above. The apparatus has a seed crystal disposing part 3a at the bottom end and has a crucible 3 housing the semiconductor melt 7

in the upper part thereof and a heater 5 for heating the melt which forms such a temp. gradient that the temp. is lower in the lower part than in the upper part on the outer side of the crucible 3. A cooling water path 11 is provided within a crucible supporting base 4 so as to enclose the circumference of the seed crystal disposing part 3a provided at the bottom end of the crucible 3. Growth is executed while cooling water is kept passed in this water path. The single crystal which is complete in the crystal from the seed crystal to the terminal part of the crystal is obtd. The solid-liquid boundary shape 15 of this crystal is confirmed to be the projecting shape over the entire area of the crystal when this shape is investigated.

Japanese Publication No. 05-194073: PURPOSE: To efficiently grow a large size single crystal when growing a compound semiconductor single crystal in a vertical crucible by keeping the bottom plane of the crucible almost flat and cooling a molten polycrystal as the raw material from the seed side to the upward in order while controlling so as to exhibit a specified temperature distribution. CONSTITUTION: A compound semiconductor such as a polycrystalline InP 12 is put in a cylindrical crucible 10 having the bottom plane inclined by an angle gamma within a range of -10 deg. to 10 deg. in the horizontal direction and the compound semiconductor is heat melted. The molten InP is rapidly cooled by 6 to 10 deg.C at the part higher than the top part of the seed 13 by controlling a slit heater 11 in the neighborhood of an InP single crystal seed 13 set to the bottom of the crucible and simultaneously controlling a heat sink 14 equipped with a pipe 15 for a cooling medium. Thereby the molten InP is supercooled so that the temperature distribution may be represented by a convex-shaped isothermal line in the direction of the crucible width. Cooling is continued from the top part of the seed 13 toward the upward while forming a thin plate-shaped InP single crystal in a prescribed area so as to grow a monolithic single crystal from the molten polycrystalline InP in the crucible 10.

Japanese Publication No. 06-247787: PURPOSE: To make the growth interface of a single crystal flat or convexed upward by solidifying the molten single crystal material without forming a cavity between the outer side face of a vertical vessel and the inner side face of a heating element. CONSTITUTION: A vertical vessel 5 charged with a single crystal material and a liq. sealant is placed on a vessel support 6, the support is set so that the vessel 5 is engaged with the insides of the heating elements 11 and 14 in a high-pressure vessel 10 and fixed to the upper end of a rotating supporting shaft 8. The vessel 10 is then evacuated, an inert gas is introduced to pressurize the vessel, and a power is gradually supplied to the heating elements 11 and 14 to heat the vessel 5 so that a specified temp. distribution is formed. The material and sealant are melted, the molten material 3 is covered with the molten sealant, and the upper end of a seed crystal 1 is melted and brought into contact with the lower end of the molten material 3. The vessel 5 is moved through the supporting shaft 8, and a single crystal 2 is gradually grown from the lower end of the molten material 3.

Dated this 23rd March 2007.

Respectfully submitted,

/Dana L. Tangren/ Reg # 37246
DANA L. TANGREN

Attorney for Applicant
Registration No. 37,246
Customer No. 022913
Telephone No. 801.533.9800

DLT:dfw
W:\14321\91\DFW0000022002V001.DOC